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SCIENCE NEWS LETTER

AUG 20 1935

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

AUGUST 17, 1935

Garden For a Dry Summer

See Page 105

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of

Current Science

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DO YOU KNOW?

Marco Polo in the thirteenth century found falconry a royal sport in China.

Fertile soil is a vague term, the U. S. Department of Agriculture points out, because every soil is "fertile" but not for all plants.

Scientists are studying the methods of handling and storing green vegetables to conserve their content of the valuable vitamin C.

The pests that infest foreign narcissus bulbs have become so firmly entrenched in the United States that hope of eradicating them is lost.

Last summer's excessive heat was the chief reason why the country's accident death toll mounted to a new record high, says the National Safety Council.

Dust-proofing the living rooms and bedrooms of houses in the Middle West is advocated by the Red Cross, which finds that this can be done for two or three dollars a house.

The four-eyed fish of the tropics has its two eyes divided, so that when the fish swims at the surface the upper pupil does scout duty in the air while the lower pupil looks down into the water.

The largest eye hospital in the world is the Royal London Opthalmic Hospital.

Tests indicate that some kinds of green vegetables, freshly harvested, are richer in vitamin C than orange juice.

In California an old Indian way of "getting along" with a mother-in-law was never to speak to her or even look in her direction.

In 1607 King James the First of England issued a proclamation against wasting wheat, much needed for food, to make starch for ruffs and laces.

When factory machinery for textiles was new, England guarded this industrial advance so closely that baggage of travelers was searched lest they carry plans for machinery abroad.

London has just had an exhibit of the art of primitive peoples, in which almost 300 museum treasures showed what islanders, jungle tribes and other natives achieve in design and hand skill.

Aztec medicine compared so favorably with European knowledge of the subject that Franciscan friars had the Indian native medicine taught in the first college they established for natives of Mexico.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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SEISMOLOGY

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PHYSIOLOGY

American Scientists Take Part In Physiological Congress

Meetings in Leningrad and Moscow Draw Large Attendance From Abroad; Presided Over by Prof. Ivan Pavlov

MANY American scientists were among the 400-odd foreign delegates to the Fifteenth International Physiological Congress, held at Leningrad and Moscow Aug. 9 to 18 inclusive. The opening address was delivered on Aug. 9 by Dr. Walter B. Cannon of Harvard University, who spoke on "Some Implications of the Evidence for Chemical Transmission of Nerve Impulses."

The Congress was held under the presidency of the world-famous Russian scientist Prof. Ivan P. Pavlov, now almost 86 years old but still engaged in active research. Prof. Pavlov's pioneer work on the "conditioned reflexes" of animals laid the foundation for a large part of modern psychological doctrine.

Meetings were held in Leningrad from Aug. 9 to Aug. 16, and in Moscow on Aug. 17 and 18. After the close of the Congress, many excursions will enable foreign scientists to visit Russian laboratories and teaching institutions, as well as to see the life of the country generally.

Importance of Bile

You die if your liver stops making bile for any considerable length of time. But there are occasions when your liver stops making bile for a short period to prevent you from dying.

The physiological significance of such "bile strikes" by the liver was discussed before the meeting by Dr. Max Einhorn, New York City physician.

Bile is one of the most essential of the digestive fluids. It is produced in the liver and poured into the intestine, where food digestion takes place. If it stops very long, death is inevitable.

But it can be stopped, apparently by an automatic safety action of the liver itself, if an overload threatens. This is of especial importance, because all digested food substances have to pass through the liver before they go on to nourish the other tissues of the body. The liver's occasional "bile strikes" thus give that important organ a chance to rest up a bit.

Dr. Einhorn cited a conspicuous "bile strike" in one of his patients, a man who had stuffed himself with food at a banquet, at the same time gulping a lot of ice water. This patient was sick for several days, during which time his liver stopped making bile. Then, his digestive system having cleared itself, the liver returned to normal functioning.

Bile is so valuable, Dr. Einhorn pointed out, that it is kept going in a constant circuit, and very little of it is wasted. After it has done its work on the food in the digestive tract, it is carried directly back to the liver by a special vein that handles all the products of digestion, so that it can be used over again.

Rubbery Bones

Giving crippled patients "rubbery" bones and then bending the deformities straight is the new technique described before the Congress by Dr. I. William Nachlas of the Johns Hopkins University Hospital, Baltimore. In collaboration with Dr. David Shelling, Dr. Nachlas has worked out a diet and routine of internal medication which softens skeletal structures.

"This change of the bone to a more or less rubbery structure will permit the manual correction of deformities for which surgical treatment is either undesirable or impossible," Dr. Nachlas explained. "The straightened limbs are then held in position by a cast or other form of support while the bones are rehardened."

A new "gland extract" or hormone, which may eventually be valuable in the treatment of gastric ulcer and similar ailments of the digestive tract, was described before the Fifteenth International Physiological Congress by Dr. A. C. Ivy, professor of physiology at Northwestern University Medical School, Chicago.

Called "enterogastrone" by its discoverer, this substance has the effect of inhibiting the action of the stomach. It is produced in glandular tissue in the walls of the upper intestine when fats and sugar come into contact. It is then carried in the blood stream to the stomach, where it produces its "quieting" effect.

Quieting an over-active stomach is one of the chief ends sought for in the treatment of gastric ulcer and similar ills. At present, treatment consists either of the abundant use of fats, such as olive oil and cream, or of atropine, which causes a relaxing of the digestive muscles. Both these treatments present somewhat troublesome disadvantages.

Dr. Ivy is not yet ready to recommend his new substance for use in medicine. It must be further purified before a trial on man is warranted, he said.

He added, however, "We hope during the coming year to make sufficient progress on the chemistry of this physiologic agent to be able to try it on the human subject."

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PHYSIOLOGY

Windpipe's "Lid" Not Used During Swallowing of Food

NEW LIGHT on swallowing and on the throat's natural defense against choking was presented by Dr. Oscar Russell of the Ohio State University, Columbus, Ohio, at the Fifteenth International Physiological Congress in session at Leningrad.

Contrary to the old idea, it is not the epiglottis or "lid" of the windpipe which guides the food down the right channel and keeps it from going into the larynx and windpipe by mistake, Dr. Russell said.

Dr. Russell's theory has particular importance for patients suffering from cancer of the larynx or voice box. In removing the cancer, various nearby parts of the throat besides the larynx are generally also removed. Three of these structures are the parts of the throat which really guide the food towards the stomach and away from the windpipe, Dr. Russell finds. Their ruthless removal in his opinion consequently accounts for the choking after food which has frequently followed these operations for cancer of the larynx.

The three parts of the throat which prevent choking, according to Dr. Russell, are known scientifically as the cartilage of Wrisberg, the arytenoid cartilages and the pulvinar. The first two isolate the larynx by combined forward movements, and the other by a backward movement.

The old idea was that the epiglottis descended from its erect position every time food is swallowed, thus deflecting it from the larynx and windpipe. In Dr. Russell's opinion, the purpose of the epiglottis is to vary the effective size of the opening of the larynx or voice box. It appears to oscillate up and down according to vocal demands, but not to shut completely, nor to have any tendency to close when food is taken.

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ENGINEERING

New Type Boiler May Bring Great Changes in Navies

High Efficiency Makes Steam Effective Rival of Diesels As Power Source; Compactness Fits for Use in Narrow Hulls

A NEW type boiler which may bring a new era into the generation of power aboard warships, especially those of the destroyer class and perhaps submarines, is described in *Mechanical Engineering* (August). So efficient is the device that it makes steam a competitor of the Diesel engine.

The ultra-modern boiler is highly compact, light in weight, and easily adaptable to the narrow hulls of destroyers, according to Adolphe Meyer of Brown, Boveri and Company, Baden, Switzerland, in his report to the American Society of Mechanical Engineers. The boiler is already coming into use throughout Europe. Because the fuel gases travel faster than sound in some parts of the boiler, it is called "Velox," coined from the word velocity.

Saves Weight and Space

The weight of the Velox steam generator is only one-fifth that of the ordinary oil-fired water tube boiler, while it occupies only one-half as much space as even the most modern marine boilers.

"In submarines," says Mr. Meyer, "the small masses, the possibility of rapid cooling by running cold air through the boiler, and the small dimensions of the exhaust pipes enable the time required to prepare for submerging to be reduced to an extent hitherto only to be obtained with Diesel engines."

"In comparison with the Diesel engine," adds Mr. Meyer, "the Velox steam generator has the advantage that every kind of oil can be used and there is no restriction as to the use of the more expensive gas and Diesel oil."

In warships, the Swiss engineer explains, the full steam output is ordinarily obtained by forcing the boilers to about three or four times the amount which such a boiler would normally give if used for other purposes.

An efficiency of 75 per cent. or less is obtained under such forced conditions. By comparison, the Velox boiler has an efficiency of between 88 and 90 per cent.

An additional naval advantage is that the exhaust gas from the boiler is completely invisible even at maximum output.

"For obvious reasons," Mr. Meyer states, "no information about Velox plants in warships is available except the fact published in British papers, that one unit is built for the British Navy by Yarrow and Richardson Westgarth, the former building the boiler proper, the latter the gas turbo-blower and other auxiliaries."

Velox boilers are already being used in various countries throughout Europe in iron and steel works, central heating plants, and steam electric generator stations.

Special advantages of the new type boiler are:

1. It can be brought up from a cold condition to its full load steam generating capacity in from 4 to 8 minutes.

2. Changes in load can be handled quickly. A drop of 50 per cent. in the load can be dealt with by the automatic control device in but 20 seconds. Even when the full load is cut off suddenly, the boiler will not blow off.

As in warships, the best features of the Velox type boiler—small space requirements, light weight and high efficiency—exactly fit the needs of railroad locomotives.

Convertible Locomotives

The small amount of space needed for the new boiler means, Mr. Meyer points out, that in locomotives adequate room can be left over for the driving and attendance. Moreover, it is possible to substitute a Velox generator on the chassis of an existing locomotive without altering the driving mechanism.

Orders have just been placed for the transformation of an existing locomotive to 2,400 horsepower and 100 miles an hour speed.

The Velox generator operates essentially as follows:

Air and fuel are mixed in a burner at the top of the combustion chamber and are blown into the chamber to burn. The entering velocity is over 1,200 feet a second, faster than the speed at which sound travels. Lining the walls of the combustion chamber are hollow evaporator tubes containing many small pipes. These small pipes are part of the water circuit of the steam generator.

Power is obtained from the device in two ways:

1. By the action of the swift-moving exhaust gases on a gas turbine which drives a blower. The blower is used to mix the air and fuel in the intake burner.

2. By the action of superheated steam on a steam turbine which drives an electric generator directly coupled to it.

Following through the mechanism by which the exhaust gases are used directly to obtain power for the blower, the first step is the partial loss of the heat of combustion to the outer walls of the evaporator tubes. Still more heat is lost as the combustion gases go down to the bottom of the combustion chamber and then back up inside the evaporator tubes. This heat is transferred to the water inside the pipes filling the evaporator tubes.

Drives Gas Turbine

Continuing on their way, the exhaust gases, now down to a temperature of 1,500 degrees Fahrenheit, enter the superheater. By the time the gases have left the superheater, their temperature has fallen to 900 degrees Fahrenheit and their velocity is between 330 to 600 feet per second. Traveling at this rate, they strike a gas turbine.

The gas turbine, in turn, drives a blower which is used to send more air and fuel into the device.

Finally the exhaust gases, now down to a temperature of 700 degrees Fahrenheit, pass out through the chimney on whose inner walls are pipes containing the water which will eventually become steam in the water-steam system of the machine.

The water-steam system starts therefore in the chimney of the steam generator. The incoming water is warmed here and passes into the evaporator tubes inside the combustion chamber, where the real heating takes place.

Separating the Water

The steam and hot water thus formed issue from fine nozzles into a vertical drum. This drum acts as a centrifuge to separate steam and water, the latter falling back for more heating and the steam passing on to the superheater.

The steam at 600 pounds to the square inch pressure and temperatures as high as 850 degrees Fahrenheit passes to a steam turbine driving an electric generator directly coupled to it.

CONSERVATION

Seven-Point Plan Offered For Mineral Conservation

VOLUNTARY cooperation between private enterprise and government conservational activities will solve the problem of America's dwindling supplies of indispensable minerals, in the opinion of Dr. C. K. Leith, professor of geology at the University of Wisconsin and member of President Roosevelt's National Resources Board.

In a recent communication to the American Association for the Advancement of Science he expressed his belief that "private industry has successfully developed the minerals of the United States to an extent never before approximated in the world," and his opinion "that the record of the mineral industry in the United States warrants the presumption that it should continue to develop so far as possible under private initiative."

"However," he continued, "we also believe that our mineral heritage is vested with a public interest in those specific conditions which are distinctly detrimental both to the public and to the industries themselves to remedy. Rugged individualism, with all its merits, seems ill-adapted to realize, unaided, the present political and economic requirements of conservation."

To realize these requirements, Dr. Leith offered a seven-point program:

(1) Continuance of technological and scientific improvements already under way.

(2) The balancing of supply and demand in our so-called surplus industries at a price level which will permit of proper conservational practice; this to be accomplished by voluntary cooperative efforts of the industry under government supervision, through legislation which will exempt them from the anti-trust law; the exemptions from the anti-trust law in the interest of conservation to be specifically defined and public supervision to be provided to make sure that the wastes on the basis of which exemption is claimed do exist and will be eliminated.

(3) The legalization of some method of coordinating the highly chaotic efforts of the individual states under their police powers, and support any collective efforts the states may attempt. Much of the authority necessary for production control now exists only in the police powers of the states. Since the Supreme Court decision, Washington is now struggling with the problem of finding authority for any national control. On the outcome of this major issue of federal versus state rights will depend largely the success of any effective program of conservation.

(4) Federal control of interstate shipments of minerals shipped in excess of quotas set by the state police powers.

(5) Possible abolition of ad valorem taxes in favor of taxes of one kind or another on current production.

(6) The use of tariffs for the surplus group which will protect any domestic economy built up in the interest of conservation, which may result in some further sacrifice of our already dwindling export trade because of the necessary maintenance of domestic prices above the world level.

(7) For the deficient group of minerals derived in part or in whole from foreign sources, to desist from a tariff program which merely hastens the exhaustion of our limited high-grade supplies, and to substitute direct expenditure by the government on the problem of finding additional supplies.

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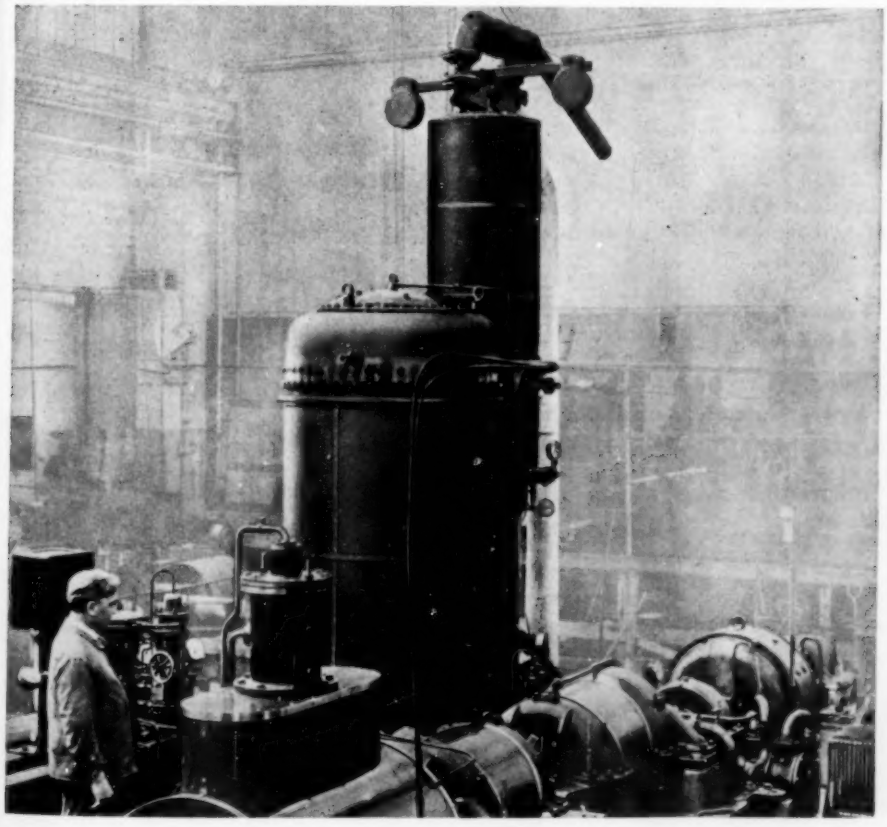

STEAM'S ANSWER TO DIESEL

Compact, powerful, economical, quick to raise steam, this boiler promises a revolution in naval engineering.

FISHERIES

Echo-Sounding Device Locates Schools of Fish

ECHO-sounding apparatus, now widely used on ships to make continuous records of bottom depth, can also be turned to good account in the fisheries industry, in locating large schools of commercial fish.

Oscar Sund, well-known Norwegian fisheries scientist, reports (*Nature*, June 8) on four instances when the apparatus on the research vessel Johan Hjort disclosed the presence of large numbers of codfish, spawning in midwater. The records demonstrated clearly the hitherto unsuspected fact that when codfish lay their eggs they pay no attention to the bottom, but maintain a position at a uniform depth beneath the surface.

Information of this kind is of great importance in conservation work, and it is presumably quite feasible also to use the echo-sounding device for the location of schools of fish in proper condition for catching.

In locating the fish schools, the apparatus worked in exactly the same manner as it does for showing bottom depth. Sound waves sent out from the ship's bottom were reflected off the fishes' backs and returned to the listening device just as they do from the rocks or mud of the sea bed. The length of time between the start of the sound and its return as a submarine echo indicates depth.

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PHYSIOLOGY

Severe Vitamin Lack Causes Nerve Breakdown

VITAMIN lack in diet, if severe enough, causes an actual breakdown and "death" of nerve tissue, experiments on rats by Dr. Charles Davison, of Montefiore Hospital, New York City, have demonstrated.

Rats were fed diets adequate to sustain life, except that each diet wholly lacked one or another of the vitamins, from A to E. The animals became ill, finally losing the use of their hind limbs.

When they were chloroformed and dissected, it was found that the nerves leading to their muscles were abnormal in appearance and structure, with an actual breakdown of the nerve substance itself, and in some cases brain hemorrhage.

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SEISMOLOGY

South American Quake Almost on Equator

THE EARTHQUAKE that caused destruction and death in the Colombian city of Pasto and in neighboring towns, on the morning of Wednesday, Aug. 7, had its center almost on the equator, near the Colombia-Ecuador boundary, U. S. Coast and Geodetic Survey seismologists announced after examining data transmitted through Science Service.

The location of the epicenter was given provisionally as one degree north latitude, 78 degrees west longitude. Time of origin was 4:02.2 A. M., Eastern Standard Time.

Stations reporting were those of the Jesuit Seismological Association at St. Louis University, St. Louis, Mo., and Georgetown University, Washington, D. C., and of the U. S. Coast and Geodetic Survey at San Juan, Puerto Rico.

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PHYSIOLOGY

Suspended Animation Possible Even to Human Beings

"Freezing" and Revival of Animals Merely Special Cases Of Inanition, Phenomenon Long Known to Physiologists

WITH LATE summer hot weather comes another nine-days'-wonder to press, radio and newsreel. Animals are being "frozen to death" and subsequently resurrected by laboratory miracles. In Hollywood, 180 persons are said to have offered themselves as human subjects for one of these super-chilling experiments. Maybe there was a hot wave in the California foothills at the time.

Although the animals used are of a higher zoological order than have figured in previous experiments of somewhat similar nature, the wonders now being reported are not wholly without precedent. At the bottom of the animate scale, bacteria and protozoa are notorious for their resistance to extreme cold. They even stand prolonged immersion in liquid air without apparent prejudice to their subsequent reproductive powers.

Interstellar Immigrants?

It has been suggested, by speculative philosophers, that evolution started with one-celled immigrants of this kind, floating in somehow, from some unknown elsewhere, through the unimaginable cold of outer space.

Higher in the scale, similar freezings have been inflicted on fish and frogs, with at least short-time survival after thawing.

Of course, all such creatures are not really frozen to death. If they were dead, they would stay dead, no matter how carefully thawed out. They are really in a state of low metabolism or life-process, known as "inanition" to scientists. With life-fires thus banked, organisms can exist for surprisingly long periods without visible signs of life.

Hibernating animals, like bears, woodchucks, ground-squirrels and turtles, display the phenomena of inanition in quite typical form. Their muscles are limp, their breath has practically ceased, there is no readily detectible heartbeat, their other organs seem to be without function. Their temperatures, even in the case of warm-blooded animals, drop to very little above that of the surrounding air. You can shake them, poke them, stick pins in them, without getting any response. Only a gradual warming-up brings them to life again.

Inanition is an organism's response to extreme conditions against which it has no other defense. It is a feigning of death to defeat real death.

We do not commonly think of man as a hibernating animal, and he is not, under normal conditions. Yet he also is capable of invoking voluntary inanition in times of stress. Prof. Sergius Morgulis, of the University of Nebraska College of Medicine, tells of a hibernation-sleep resorted to by Russian peasants in famine times. They huddle together on the tops of their great flat stoves, by families, even by whole villages. Covered with all the fur coats available, drawing warmth from the stove and from each other, they conserve their life energies to the utmost, and with only a few unavoidable interruptions, wait for spring in practically continuous sleep.

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PHYSIOLOGY

Radium Never Stimulates; Effects Always Lethal

RADIUM'S effects on living cells are always in the direction of breakdown and death; its powerful radiations, principally of alpha particles, never act to stimulate more rapid growth.

These are the conclusions reached by Prof. Frederick B. Flinn of the College of Physicians and Surgeons, New York, as the result of experiments on tissue cultures from living embryo chick hearts, checked up with other animal cells and with one species of primitive one-celled plants.

Prof. Flinn's interest was aroused by the tragic fate of a number of women workers on radium-illuminated watch faces, who suffered breakdown of their bones, particularly of their jaws, from the effects of radium unwittingly taken into their systems.

In his researches, the New York physiologist used chick heart tissues, cultured in the way developed many years ago by Dr. Alexis Carrel, of the Rocke-

feller Institute for Medical Research. Each culture was divided into two halves, one of which was treated with radium in various degrees of intensity, while the other part was kept untreated as a check or "control." The type of tissue chosen was that most early resembling the fibroid or cancerous growths that have replaced healthy bone in the radium-sick patients.

In no case was it found that a radioactive solution, even the weakest, was stimulative of extra growth. Any concentration of radium strong enough to have any effect at all had a slowing-down effect, and above a certain minimum strength they eventually killed the tissues exposed to them.

Dr. Flinn was therefore brought to the conclusion that the replacement of radium-destroyed bone by malignant fibroid tissue was due first to the destruction of the bone-repairing cells, which permitted the decay of the bone and its subsequent failure to re-form even when extra calcium is medicinally administered, followed by the abnormal tissue growth, and frequently by bacterial infection, as the result of the constant irritation which is known to occur at sites of fracture and of greatest bone stress.

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PHYSICS

New Apparatus Makes Tests on the Singing Voice

EVALUATION of a singer's voice is no longer dependent on widely variable opinion which the human ear helps to form. Tests by the scientists of the Electrical Research Products, of New York, with special, newly-devised instruments, make it possible to measure acoustically the qualities of a given singing voice. Any voice can be compared with an ideal voice represented by curves already prepared. The ideal voice has the power of Caruso and the other special attributes which all good singers possess in part but none completely.

S. K. Wolf, D. Stanley and W. J. Sette, of the New York firm of electrical consulting engineers, describe (*Journal of the Acoustical Society of America,* April, 1935) how they used automatic high speed level recorders, crystal harmonic analysers and an acoustical spectrometer to study voices.

Over one hundred singing voices were studied in the tests. Of them all, that of Lauritz Melchior, tenor of the Metropolitan Opera Company, was the nearest approach to the "ideal." His voice fitted almost perfectly the ideal reference curves already established.

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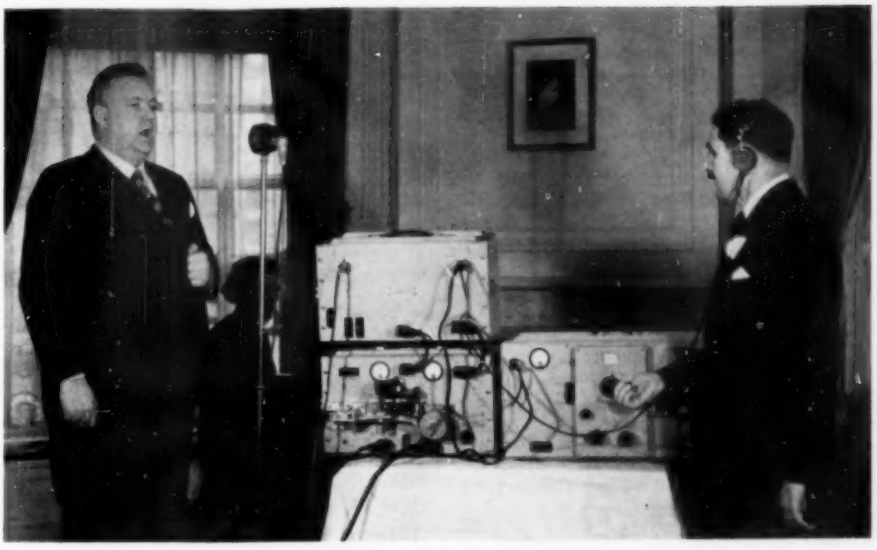

THE SHAPE OF A VOICE

Lauritz Melchior, Metropolitan opera star, submits his voice to the consideration of a wholly mechanical critic—and comes out triumphant.

ECOLOGY

Lake Turns to Desert When Unwisely Drained

DESTRUCTION'S course, from lake to sandy desert in the middle of Wisconsin, has been traced by Prof. Norman C. Fassett of the University of Wisconsin.

The region lies in what is known as the "driftless area," a part of the Midwest that was not covered with ice during the Glacial Age, overlapping the adjoining corners of the states of Wisconsin, Minnesota, Iowa and Illinois. It is called "driftless" because of the absence of the "drift" soil produced by the glaciers everywhere else in that part of the country.

Part of the driftless region was occupied during the Ice Age by a great shallow lake, which geologists called Lake Wisconsin, lying in what is now central Wisconsin. Prof. Fassett relates its decline and fall in a single sentence: "The bed of this lake has largely developed into bog; the bogs were drained some 25 years ago, the dry peat burned, and the ashes blew away, leaving a sandy desert."

Into this costly monument to man's bad judgment in land-and-water management, trees and lesser plants have moved. The trees consist principally of jack pine, scrub oak and quaking aspen. The smaller plants have a decided flavor of the Southwest about them: bluestem grass, prairie clover, false indigo and leadplant. They seem to be making themselves quite at home on the sand.

The driftless area generally has good cornland on the plateau-like tops of its uplands and on the flat bottoms of its ravine-like valleys. The slopes are too steep for cultivation. According to exposure, they bear heavy stands of timber or are covered with prairie grasses. Both timbered and grassy slopes are for the most part over-pastured, so that the natural slow process of erosion has been destructively speeded up.

To the student of nature, the great interest of the driftless area lies in its character as a meeting-place of diverse types of vegetation. Not only are there prairie plants on the exposed slopes, but in the more sheltered parts there are species, such as the Arctic primrose, that are not to be found anywhere else this side of Labrador. Besides these, and constituting the great number of strange species, are plants found elsewhere only in the southeastern United States, especially in the southern Alleghenies.

It appears probable that these plants were there before the last great advance of the glaciers, perhaps longer, and that they lived there during all the centuries of glaciation, an island of flowers in a sea of ice.

Science News Letter, August 17, 1935

PHYSIOLOGY

Kidney Substance Hastens Loss of Salt From Blood

KIDNEYS produce a definite glandular substance which acts to hasten the loss of salt from the blood and other body tissues. Evidence to this effect was produced before the meeting of the Fifteenth International Physiological Congress, by Dr. Benjamin Jablons of New York City, who has extracted it in concentrated form.

Injected into laboratory animals, it causes a temporary but quite definite fall in blood pressure, which can be neutralized by the injection of saturated salt solution. If too much of it is given, the animal is in danger of dying, but this can be prevented by the administration of salt.

The exact chemical nature of the new-found substance is not yet determined. It has, however, been found to be easily soluble in water and concentrated alcohol but insoluble in ether and acetone.

Science News Letter, August 17, 1935

MEDICINE

Scientists Have Headaches To Check Their Mechanism

SEVERE headaches and pulsations of the brain fluid were linked at the International Neurological Congress at London by the American physicians Drs. Dean Clarke, Heloise Hough and H. G. Wolff of Cornell University Medical School, New York City.

When a headache is most severe the brain fluid pulsations are the largest, according to experiments in which subjects were given temporary laboratory headaches.

The chemical known as histamine was injected into the veins to bring on these experimental headaches. Histamine is created by the body tissues, especially the lungs and the gastro-intestinal tract.

Brain fluid pulsations were measured by inserting a hollow needle into the spinal cord and connecting it to an instrument known as a Frank capsule.

Pulsation changes within the brain, pulsations in the arteries and the blood pressure were all recorded automatically and simultaneously on photographic film for permanent record.

When histamine was injected, the physicians found the arterial pressure increased and the cerebrospinal fluid pressure diminished while at the same time the intracranial pulsations increased and the headache became more severe.

In experimentally produced headache pain is associated with dilatation and distortion of the intracranial vessels. The sites of origin of the nervous impulses experienced as pain are probably the walls of the intracranial blood vessels and the perivascular tissues. This is further evidence that deformation of the intracranial blood vessels is an important factor in the production of headache as manifested clinically, the Cornell University scientists conclude.

Science News Letter, August 17, 1935

SEISMOLOGY

Seismograph Records Breaking of Drought

A SEISMOGRAPH, designed primarily for the study of earthquakes, made a record of the breaking of the West's great drought. It also showed the effects of daily warmings and nightly chillings on the earth.

The instrument was designed and built by Mrs. M. M. Seeburger of Des Moines, Iowa, who has taken up the study of earthquakes as a serious scientific hobby.

When it was first put into service, in 1934, the soil was dry and shrunken together to a depth of several feet. So parched was the earth that a crack half an inch wide appeared even in the floor of the seismograph room.

As the heavy rains of spring and early summer fell, soaking the earth and permitting it to swell back to its normally moist condition, the drought-crack in the floor closed up, and the whole ground-level tilted. The tilt was so slight as to be imperceptible by any ordinary means, but the seismograph, designed to be so sensitive as to detect earth tremors from as far away as India or South America, detected the change. Daily the line it traced on its moving sheet of smoked paper departed sharply from the straight course it should have followed and went slanting off at an angle.

Last winter, the instrument detected a daily tilt of the earth in the neighborhood of the Seeburger home. This always set in during the forenoon when the sun had warmed the frozen soil, causing it to expand a little. At night, when the soil chilled and contracted again, the tilt was reversed and the instrument's records went back to normal.

This tilt-recording activity of the seismometer did not interfere with its regular function. Earthquakes are recorded as wiggly breaks in the normal straight line. Tilts are recorded by the departure of the line from its usual direction. An earthquake can be recorded even when the line is slanting off at an angle.

Science News Letter, August 17, 1935

IN SCIE

GENERAL SCIENCE

Science Advisory Board Extended By President

THE SCIENCE Advisory Board, the group of fifteen eminent scientists appointed to respond to requests for advice from the President and Secretaries of the various departments upon scientific questions, has had its life extended until Dec. 1 of this year by an executive order of President Roosevelt. Originally established July 31, 1933, its term of existence was to end July 31 of this year.

The SAB has considered many important problems referred to it by government departments, including those relating to weather, land use, airships, etc. Many of its inquiries are still under way.

Science News Letter, August 17, 1935

PUBLIC SAFETY

Mine Safety Record Capable of Improvement

NO LESS than 75 per cent. of the 2,500 to 3,000 mine fatalities each year could be prevented by the adoption of methods and apparatus recommended by the U. S. Bureau of Mines. That is the opinion of Daniel Harrington, Chief Engineer of the Safety Division.

Thanks to untiring efforts of the Bureau, the modern miner can be almost as well protected as the knight of old in his massive armor. Exhaustive tests are constantly being made to devise every possible safeguard for the lives of men engaged in coal, metal, and other types of mining. When tests have proved that an article of equipment is relatively safe, it may be listed as "permissible." Personal articles such as "safety clothing" receive recommendation for use.

Mining is a hazardous occupation at best, and not even the Bureau's O. K. of permissibility or recommendation can guarantee absolute safety. No explosive, for example, is absolutely safe. Scientific study can, and has been able to discover which explosives present the least danger of igniting gases and causing ghastly disaster. Those giving out a quick flame when they explode are less dangerous than those exploding with a slow flame like black powder.

Science News Letter, August 17, 1935

FIELDS

MEDICINE

Cures Own Nosebleed With Snake Venom

WHEN nothing else will stop the nose from bleeding, snake venom will do it.

This has been the personal experience of two young New York physicians, one of whom, Dr. Simon Dack of Mount Sinai Hospital, describes his own case and that of his friend (*Journal of the American Medical Association,* Aug. 10).

Theirs is the first report of the successful use of snake venom in intractable nasal bleeding, they state. It has been almost two years since they were given moccasin venom by Dr. S. M. Peck, also of Mount Sinai Hospital, New York City, who introduced this form of treatment for bleeding.

One physician's nose bled severely every day. Various treatments were tried without success. Then Dr. Peck injected some snake venom under the skin: he kept up the injections over a period of five months. The nasal bleeding became more and more infrequent, and after the first three weeks it ceased entirely. Dr. Dack has had no more trouble and no more snake venom for two years.

The other physician began to have hemorrhages of the nose every day or two. The attacks lasted for several hours and sometimes for several days. He was given four injections of moccasin venom at weekly intervals. After the first injection the bleeding stopped. It was eighteen months before he had another attack and that was slight. If he has other recurrences, a second course of injections will be given.

Science News Letter, August 17, 1935

AGRICULTURE

Texas Cows Tipple And Give More Milk

GIVE your cows a drink if you want them to return lots of milk.

And Texas cattle surely do like their liquor!

That is what E. R. Eudaly, dairy specialist for Texas Agricultural and Mechanical College, told a group of farmers meeting in Houston recently.

Obviously, however, cocktail hours for cattle are impractical. Cocktails, just like gin, whiskey, and other hard liquors, would be too expensive.

The thing to do, therefore, is to feed cows water flavored with liquor. This is because they like such water, and will drink more of it than they will water that smacks of the Volstead era. And when cows drink more water they give more milk.

Mr. Eudaly has concocted a special "brew" for cattle. It is simply fermented water out of silage trenches. Its alcoholic content is less than one-tenth of one per cent., but cattle drink a great deal of it, Mr. Eudaly said.

Science News Letter, August 17, 1935

CONSERVATION

New Dams Provide Refuges For Waterfowl

NEW LINKS in the chain of water fowl and wild life preserves in the United States will be forged when the U. S. Reclamation Bureau completes 11 dams now under construction. Extendingn from the Mexican to the Canadian borders, the 48 dams constructed during the 33 years of the Bureau's operation are located in 12 western states, according to Dr. Elwood Mead, Reclamation Commissioner.

President Theodore Roosevelt recognized the value of these reservoirs in the preservation of wild life, and since 1908 all reclamation storage lakes have been set aside as wildfowl sanctuaries.

"In the arid West, these lakes are of particular value in the waterfowl conservation program, since in many localities they are the only bodies of water to be found," says Dr. Mead.

This lack of water was the result of the drainage by irrigationists in the early days of the few shallow lakes previously frequented by waterfowl. The Tule Lake in northern California, for example, was partially drained 25 years ago.

Although 11 new dams are now under construction, approximately six more have been planned and will be built in the near future. Two dams are being built on the Colorado river, one on the Arizona-California boundary, and one on the Arizona-Nevada boundary.

Two more are under construction on the North Platte River in Wyoming. Dams are also being built on the Duschene River, Utah; the Ogden River, Utah; the Sun River, Mont.; the Snake River, Idaho; the Malhuer River, Ore.; the Grand Coulee River, Wash.; and the Humbolt River, Nev.

Science News Letter, August 17, 1935

ENTOMOLOGY

Air Attack Used By Troublesome Tree Pest

AIR ATTACK methods are aiding cankerworms, one of the most troublesome of tree pests, to succeed when their crawling invasions are blocked by methods good "against infantry."

For over a hundred years conscientious gardeners, farmers and orchardists have been placing sticky black bands around their trees, thinking that this practice would insure them protection.

Dr. Albert Hartzell, entomologist of the Boyce Thompson Institute for Plant Research, has found that this is not enough, so long as there are winds.

The larva of the cankerworm has strands of silk streaming from it; a wind picks up the larva and the silk strands get tangled up in the tree foliage far above the band. Such larvae have been found on trees as far as one hundred feet from infected areas.

The only answer to this air attack is chemical warfare: they will have to be fought in the treetops with arsenate and rotenone sprays.

Science News Letter, August 17, 1935

BOTANY

Neither Drought nor Heat Can Damage Cactus Beds

See Front Cover

DROUGHTY summers of the recent past may have had something to do with the rapid rise in favor of cactus gardens. For cacti certainly are excellent things to have on the place when the sun is hot and the wind is dry and there is no rain in sight. They turn their thick hides and bristling spines against an unfriendly world, and sit tight to await better times.

The interesting cactus vista reproduced on the front cover, from a grouping at the famous Missouri Botanic Gardens in St. Louis, gives an idea of what can be done with these desert succulents, plus a few other desert plants. The big round cacti, which contribute so much of character to the picture, are of the "Golden Barrel" variety.

The present high horticultural favor of cacti, however, is not without its disadvantage. Commercial "cacticians" are raiding the desert to an ever-increasing extent, robbing it of its choicest specimens over widening areas. Botanists and conservationists are beginning to express considerable concern and to demand legal protection, lest the desert become a desert indeed.

Science News Letter, August 17, 1935

DIETETICS

Summer Drinks Have Long History

Old World Contributed Iced Tea, Iced Coffee, Lemonade; Vanilla, Pineapple, Chocolate, Are Gifts of the Americas

By EMILY C. DAVIS

YOU CLIMB up on the soda fountain stool and murmur, "What've you got?"

And the soda clerk automatically drones back, "Strawbry, vunilla, choclet, orrunge, maple, pynapl, lemn, razbry—" as if it were the most natural thing in the world for all those flavors to be at his command, in a row of spouts before him.

But if soda clerks, and soda drinkers, ever took time out to do a little serious research on the situation—which sounds like an absurd warm weather suggestion—they might raise one over-heated eyebrow, anyway, over the "triumph of civilization" which the long line of flavors represents.

Cleopatra never imagined anything like it. Nor any other ancient and sophisticated royalty you can think of. So many flavors to choose from at once, or to mix into glorified punch in the home kitchen, would have dazed your ancestors not so many generations back.

Even a slight and not-too-energetic dip into serious research brings up impressive facts about hot weather drinks.

Discovering America, for example, was a big turning point in the history of flavors. No America—no chocolate, vanilla, pineapple, or even maple. The Indians had those and they were real American products. True, a sweet sap can be extracted from Old World maple trees but it is not the rich yield of the American sugar maple. The Indians deserve credit for giving maple sugar to the world, it is generally admitted.

Contrariwise, without Old World contributions, there would be no orange, lemon, lime, peach, almond, or ginger in the modern flavor list.

Historians tell many quaint incidents of fruits and flavors being carried off from one country to amaze and delight another. The Greeks became acquainted with bananas when Alexander the Great returned from an East Indian expedition. The orange was spread from its Oriental home through Europe on the tide of Mohammedan conquest. Lucullus, who revelled in luxuries, introduced cherries to Roman banqueters from foreign lands near the Black Sea.

The Wandering Strawberry

The strawberry had a particularly curious adventure. Strawberry flavor as we know it is American. For although the Old World had its strawberries, modern aristocratic berries are descended from American berries carried over to Europe by early explorers and returned by the colonists.

Exploration and trade, penetrating far corners of the earth, are still adding new flavors to quench the civilized world's thirst pleasantly. And chemists concocting synthetic flavors copied from nature, or finding ways to store elusive flavors in cans and bottles on the shelf, are still doing their bit to extend the line-up. The delicate essence of apple, for instance, was isolated a few years back by a Government chemist, and may yet gain popularity in apple ice cream.

Ethiopians invented coffee and the Chinese started tea drinking. But when, nobody knows.

One thing is certain. "What to drink on a thirsty, hot day?" is a question as worldwide as summer weather and as old as man.

Stone Age man dragged himself out of his cave on a blazing hot afternoon and shambled down to the nearest stream for a cool drink. It was about all he could do—unless he caught on to drinking sap, fresh or fermented. Primitive folk in India today know that sap-sipping trick. In the East Indian heat, sugary sap of palm trees ferments fast. So the native can shin up a tree, cut the central bud to form a depression, and next day shin up again with a straw to drink palm wine.

Stone Age cave men may not have been quick-witted enough to try that sort of stunt. But as soon as man learned to sow grain and began to take on culture, he invented drinks, many of them, and he had been inventing, mixing and tasting ever since.

Beer, for instance, has a very old and varied history. Babylonians and their neighbors devised scores of separately named kinds of beer, and Egyptians ran close second. Scholars can point to a Babylonian beer recipe dating from 2800 B.C. It sounds even older when you say 4,700 years ago. Wine, of course, is older than that, considering that nature makes it when conditions favor, and has been making it for uncounted ages.

The exact date in history when a Chinaman first drank a cup of tea is lost—a sad thought, for it was a memorable occasion and deserved a proper tablet or at least a dutiful historian at the tea-drinker's elbow.

But about 2700 B.C., the scholarly emperor Chen Nung is traditionally said to have soberly praised tea drinking.

"Tea is better than wine," Chen Nung is quoted as saying, "for it leadeth not to intoxication, neither does it cause a man to say foolish things and repent thereof in his sober moments. It is better than water for it does not carry disease."

It was a few thousand years after that—3,600 years, to be somewhere near the date—that Japan took to tea. It sounds like a long interval, even for the conservative East, but, then, Chinese tradition may be wrong in crediting so old an Emperor as Chen Nung with tea drinking.

England began its Age of Tea not so long before the Boston Tea Party. Sam

Pepys, noted diary writer in the seventeenth century, included tea drinking among his novel pleasures and adventures.

The world owes its coffee drinking to Ethiopia. But no one has yet discovered how many centuries Ethiopians kept their coffee-bean drink to themselves. If Ethiopians were enjoying coffee in the days of King Solomon, Nebuchadnezzar or Julius Caesar, the secret never got out. Or else, the dark brew was under-rated by wanderers who might have carried its fame back to Egypt, Greece, or Rome.

In any case, it was about the twelfth century A.D. before Arabians borrowed coffee from Abyssinians, and several more centuries before England had its coffee houses and "speakeasies" where coffee was stealthily sold without benefit of the required tax.

Iced lemonade for the Emperor!

That was the order in the Mongol Emperor's palace, when hot weather thirst struck medieval China.

Cold chocolate and more of it!

That was what Aztec Emperor Montezuma called for in his Mexican palace, across the sea in undiscovered America.

What thirsty royalties drank probably tasted no better than the long, cool drinks of modern kitchens and soda fountains, but they did get fancy service. There is no denying that.

The Emperor's lemonade in China was so extremely personal and important a matter that he appointed a high official to see about it.

The record of one Lord High Lemonade Mixer, or whatever his medieval title would be, was described by Dr. Berthold Laufer, late curator of anthropology at the Field Museum of Natural History. The court lemonade maker was Mar Sergius, a Christian who founded a Nestorian church in China, 1281 A.D.

Mar Sergius was famed, as his ancestors before him, for his skill at preparing cool drinks known as sherbets, including lemonade. He had a diploma from the Mongol Emperor—a gold tablet—granting him the privilege of specializing in this honorable task. And he was obliged to send to the court each year forty jars of sherbet, made from juices of lemons, grapes, quinces, and oranges.

On various occasions, Mar Sergius was ordered to journey posthaste to various points in the empire to prepare the drinks for special functions.

The sherbets, Dr. Laufer explained, were believed by the Chinese to have curative powers. And this was long before the important nutritive value of vitamins in fruit could be even guessed at.

The custodian of the royal chocolate pot in the Aztec palace was, if anything, more impressive. He had a much bigger job. Montezuma drank fifty pitchers of chocolate a day himself, and he demanded perfect service.

Imperial Chocolatl

Prescott in his famous work, "The Conquest of Mexico," gives the picture vividly:

"The Emperor took no other beverage than the chocolatl, a preparation of chocolate, flavored with vanilla and other spices, and so prepared as to be reduced to a froth of the consistency of honey, which gradually dissolved in the mouth. The beverage, if so it could be called, was served in golden goblets, with spoons of the same metal or of tortoise-shell finely wrought.

"The Emperor was exceedingly fond of it, to judge from the quantity—no less than fifty jars or pitchers being prepared for his daily consumption! Two thousand more were allowed for that of his household."

There are two main reasons for drinking something—whatever you like best—on a hot day. But some drinks rate high, some low, on these two points: cooling value and nutrition value.

It is worth while checking up, sometime, to see what you get out of your hot weather drinking.

To start off with an unpopular truth, a hot drink is more cooling than an iced one, other things being equal. The hot drink cools by making you perspire. The evaporating perspiration lowers the temperature of your body. The cold drink, contrarily enough, causes the body to increase heat production.

However, "other things" are not always equal between hot and cold drinks. If a hot drink contain shovel-loads of sugar, and much cream or chocolate, it may be a heating drink after all. For sugars and starches and fats stoked into the body engine burn with a high heat production. On the other hand, fruits and vegetables produce comparatively little heat as the body consumes them, even taken in cold.

But whether you prefer your drinks hot or cold, it is advisable not to take them highly iced. So physicians generally agree. And if they are iced, drink slowly. (They last longer that way, anyhow).

Balancing the values on hot weather drinks has to be done in a very general way, because the ingredients that rate minus for cooling may rate a good plus for their food value. Flavored milk or cream beverages, for example, are an excellent means of keeping up the milk ration in your diet.

Fruits are deservedly popular in hot weather drinks because they meet so many requirements. Besides their flavor, they provide water, sugar and important vitamins, and, as already said, they do not heat up the engine. Many vegetables have the same advantages, and the tomato and sauerkraut juice cocktails now popular may be only a starter when drink inventors get to work on vegetable drink possibilities.

Incidentally, a good idea for keeping cool comes from laboratories working at the serious business of helping miners to withstand intense heat. This is the discovery that a simple pinch of salt in your drinking water will help you to stand heat. The amount of salt added should be small, not enough to make the water really distasteful.

The physiology of it is this: when you perspire, the body loses salt as well as water. The exhaustion you feel in these circumstances is due to loss of both these elements, not a mere need of water alone.

Salted water may not be a delightful drink, but it is one of the very practical things that can be "done about the weather," Mark Twain to the contrary notwithstanding.

Cool Drinks From Many Lands

Mexican Cocoa

6 cups milk
1 cup sugar
2 tsp. vanilla
6 heaping tsp. cocoa
2 eggs

Cream sugar and eggs well together. Blend the cocoa with a cup of cold milk, and cook with the rest of the milk in a double boiler, for about five minutes. Remove from fire, and slowly stir into the egg and sugar mixture, stirring continuously until it is well mixed. Add vanilla and beat with egg beater until deep foam rises. Serve hot or cold with a dusting of cinnamon on each cup.

Chinese Lemonade

Chinese lemonade has these proportions, as recommended in a modern Chinese cook book: One half-pint lemon juice, strained, combined with one pint of sugar and three pints of water. Keep it cold.

Indian Maple Drink

Maple sugar in cold spring water is a native American beverage idea. A Chippewa hostess up Minnesota way served this to Miss Frances Densmore, scientific collector of Indian songs, one hot summer afternoon. "A most refreshing drink," Miss Densmore found it, "especially when one sits under the trees from which the sugar was made."

Norwegian Fruit Soup

Fruit soups are a good hot-weather idea from Scandinavia. More versatile than most soups, the fruit soup can be served to open a meal, to top it off, or to go with afternoon coffee:

1 cup prunes
1 cup raisins
2 qts. cold water
1 lemon
½ cup grape juice
¼ cup minute tapioca
sugar to taste

Put prunes and raisins on to boil with the cold water. When the fruit comes to a boil, add the tapioca and cook until tapioca is tender and translucent. Add the lemon sliced thin, one-half cup grape juice (or grape jelly), and sugar to taste. Serve cold.

Tomato-Kraut Cocktail

Mix equal quantities of tomato juice and sauerkraut juice. About one-half teaspoonful of lemon juice may be added to a cocktail sized serving.

Honey Blossom

A simple drink that has considerable food value is this, described by Cornell University's home economics department:

Add three ounces, or about one and one-half tablespoons of honey and two to three ounces of fresh lemon juice or orange juice to a pint of milk. Shake it until the honey is blended. Serve cool.

Frosted Coffee

Make the coffee strong—about one and one-half times as strong as for a hot drink. Pour the hot coffee directly over the ice. Add sugar and cream to taste, and a spoonful of ice cream. Serve at once. Do not store in refrigerator.

Fruit Punch

And to show what Americans can do with tea, here is a popular up-to-date fruit-tea mixture from that best-seller cook book, "Aunt Sammy's Radio Recipes Revised." Aunt Sammy, now sold by the U. S. Superintendent of Documents for fifteen cents, was on the Department of Agriculture's free list for a while, but, pay or free, the book recently passed the 715,000 mark.

4 cups sugar
3 cups water
2 dozen lemons
2 qts. Strawberry juice (or other berry juice) bottled, or 2 qts. crushed fresh fruit
1 dozen oranges
2 qts. freshly made strong tea
½ tsp. salt
1 qt. ginger ale or carbonated water

Boil sugar and water together to make heavy sirup, and cool. Scrub oranges and lemons, and squeeze out juice. Barely cover the fruit skins with water, let stand for an hour or longer, pour off the water, and add to the fruit juice. Add the other fruits, sirup, and tea. Just before serving, add chopped ice, the ginger ale or carbonated water, and, if the punch is too strong, ice water in small quantities until the desired strength is found.

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●RADIO

Tuesday, August 20, 3:30 p. m., E.S.T.
WHY WE NEED BIRDS AND MAMMALS, by Dr. Joseph Grinnell, Professor of Zoology, University of California.

Tuesday, August 27, 3:30 p. m., E.S.T.
BEFORE COLUMBUS CAME, by Dr. H. J. Spinden, Curator of Prehistoric and Primitive Art, Brooklyn Museum.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

ENTOMOLOGY

Japanese Beetle Pest Spreading in Cities

JAPANESE beetle season is now at its peak. Although the first beetles of the season were found about a week later than usual this year, warm sunny weather during July helped the foliage destroyers to catch up to the schedule.

Residents of parts of New Jersey and Pennsylvania where the beetles were first discovered in 1916 will be pleased to learn that the beetles are becoming less numerous in these localities.

Unfortunately this cannot be said of other areas, for in general the pests are more numerous this year than usual. They appear to be slowly spreading throughout the East.

Large metropolitan areas of New York, Philadelphia, Wilmington, and Baltimore are one field of noticeable expansion for the beetles this year. They are being found there in city streets and parks, as well as suburban residential sections. Other points outside the area of continuous infestation report noticeable damage for the first time.

This year's increase was expected by entomologists, because of favorable weather conditions during the summer last year. Frequent rains during July and August 1934 were especially favorable to larval development.

One annoying feature of the beetle season occurring during the past few weeks was the sudden invasion of New Jersey beaches from the Atlantic Highlands and Sea Bright down to Manasquan. Millions of the beetles were blown by storms into the ocean, to be cast back by the waves onto the beaches of summer resorts. Bathers complained of getting beetles in their mouths, noses, and inside their bathing suits.

A note of encouragement comes with the report to Science Service of C. H. Hadley, at the Moorestown, N. J. Station of the Bureau of Entomology and Plant Quarantine, that increased feeding on the beetles by birds has been noticed.

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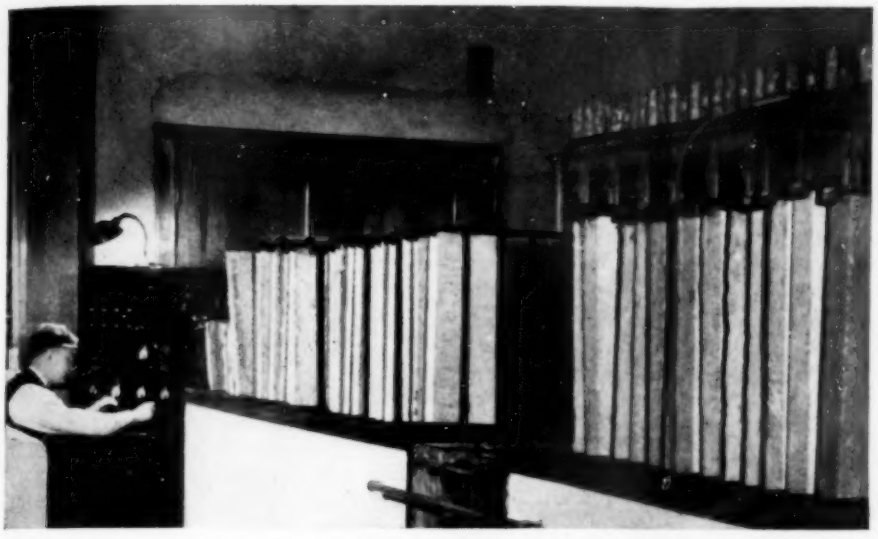

SEA'S CHALLENGE MET IN LABORATORY

PSYCHOLOGY

Engineering Methods Aid In Study of Workers

ENGINEERING methods applied to the study of human beings that enabled one plant to reduce its labor turnover from an expected range of 30 to 60 per cent. to only 6 per cent. per year, were described by Dr. Harvey N. Davis, president of Stevens Institute of Technology, in an address under the auspices of Science Service in New York.

"For years you have been fussing over your raw material specifications that were already good enough," Dr. Davis quoted an engineer as having told the industrialist in charge of the plant. "At the same time, you've been spending more each year on labor than on all your raw materials put together and spending it as blindly as if human beings were neat little packages of some thoroughly standardized product that needed no investigation beyond looking at the label."

The industrialist was impressed and put the engineer right at work on human investigation in his plant.

The chief difficulty in the way of such a study of human beings, Dr. Davis explained, is the fact that no two humans are exactly alike. When a metallurgist studies a piece of copper, he knows that what he finds out will apply not only to this individual piece but to all other pieces of identical specifications. No two human individuals that walk into a laboratory are ever exactly alike.

This difficulty can be in part overcome by the use of statistical methods. Although the individual may be unpredictable, still study of a large group will give results that will apply to other large groups selected similarly.

"Another basis for the scientific study of human beings is that we seem able to separate out of the infinitely complex mental make-up of individuals, a number of independent powers of abilities or aptitudes that can be measured and studied each by itself," Dr. Davis said.

Two simple tests developed by the engineer for use in selecting girls for factory work were cited by Dr. Davis as examples. One was a finger dexterity test. The girls were required to pick up pins, three at a time, and put them quickly into holes in an aluminum slab. The other test required the doing of practically the same task by the use of tweezers instead of the fingers.

The factory had always worked on the assumption that these two abilities, which seem so similar, were in fact identical. After a girl had been trained and become proficient on the finger work, she would be transferred to the tweezer job.

Testing revealed the surprising fact that the two abilities are entirely different. The best finger workers stood no better chance of being good tweezer workers, therefore, than any that might be picked from the poorest finger workers or selected at random from the employment office.

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ENGINEERING

Miniature Ocean Tests Concrete Resistance

A FEW minutes' drive from Chicago's sweltering business section, sea breezes blow and cooling waves throw up a salty spray, with not a bather or a bronzed life-guard in sight.

Unfortunately for heat-stricken citizens, the "ocean" is in the research laboratories of the Portland Cement Association, where the action of sea water on concrete is being studied.

Contained in two eleven-foot tanks of concrete is water, just like sea water, only four times as concentrated. Electric pumps stir up the "waves" and cause them to break against miniature cement piles, similar to those that hold up the piers at the seashore.

Here the tide takes twice as long to come in and go out as in the natural ocean, for it is high tide in the tanks alternately every twenty-four hours. Engineers decided that the longer period of immersion and drying would be a more severe test to the concrete than a natural twelve-hour cycle.

The concrete piles are of varying quality, and the depth of penetration of the "sea water" is checked daily by extremely accurate electronic meters. "Tides" rise and fall exactly one foot.

The tests will be carried on for years, and engineers expect to obtain precise data on the destructive effect of sea water on concrete, which will enable them to secure a longer life in concrete used in sea-water construction jobs.

Science News Letter, August 17, 1935

BIOCHEMISTRY

Pellagra-Preventing Vitamin Suspected of Being Twins

ARE SCIENTISTS on the way to the discovery of another vitamin? Experiments reported by Drs. Albert G. Hogan and Luther R. Richardson of the Missouri College of Agriculture indicate that vitamin G—the one which must be attained by the body if pellagra is to be prevented—may have a plural nature.

Vitamin G, it is recalled, is a separate factor formerly considered part of the original vitamin B. Prof. E. V. McCollum, of the Johns Hopkins University, in 1925 discovered, however, that vitamin B really was composed of two types, called vitamins B_1 and B_2 abroad, or B_1 and G by American scientists. In 1926 the late Dr. Julius Goldberger and his collaborators at the U. S. Public Health

Service identified vitatmin G as the pellagra-preventing factor.

Now vitamin G, in turn, may need to be broken down into separate parts. Various experimenters have been having difficulty in checking each other's work in vitamin G studies, and it has been suggested by Drs. Hogan and Richardson that the confusion is due to the existence of at least two different deficiency diseases, related to the vitamin B complex.

One disease is a severe form of skin irritation, or dermatitis. It was created by Missouri scientists by feeding rats a source of vitamin B which has been intensely radiated with ultraviolet light. After developing the dermatitis, the rats died.

The second disease was one in which experimental rats lost all their hair, became miserable in appearance and finally died. It was caused by feeding the rats a source of vitamin B called tikitiki, an alcoholic extract of rice polishings.

The denuded type of disease was cured, the scientists report, by feeding the rats flavine.

Wheat germ oil cured the dermatitis type of disease, but flavine would not do so.

Describing the two different types of disease and the means of curing them, Dr. Hogan said:

"These additions to our knowledge should help the biochemist in deciding whether other vitamins exist. They should help the clinician in deciding the relation between vitamins and pellagra, and possibly between vitamins and other diseases."

The experiments of Drs. Hogan and Richardson have been published in the British science journal (*Nature*, Aug. 3).

Science News Letter, August 17, 1935

DIETETICS

Spinach Over-Rated As Source of Iron

SCIENCE is coming to the defense of the youngster who refuses to eat his spinach.

Mother, it seems, is only partly right when she pleads with Junior to "Eat your spinach—it's good for you."

It's good for him, but not nearly as good as it's been cracked up to be. It just can't be spinach that enables Popeye the Sailor to perform all those red-blooded feats in the movies. For spinach contains iron, but—

New studies at the University of Wisconsin, carried on in those agricultural chemistry laboratories which have already made countless contributions to the knowledge of vitamins and minerals, show that only 25 per cent. of the iron in spinach is "available," as scientists put it. That is, only one-quarter of it is in a form that is usable by the body. Other vegetables are no better than spinach in this respect.

A higher proportion of the iron in meat is available, according to the Wisconsin investigators. More than 60 per cent. of the iron in heart muscle and liver —both of beef and pork—is usable for blood-building. In ordinary beef the proportion is 50 per cent. In oysters it is less than 25 per cent. The iron in cereal breakfast foods and grains is also only partly available.

It must be remembered that these figures represent only the *proportion* of the total iron which is available. Any attempt to rate foods in the order of their value as iron carriers must consider also the *total amount* present—in fact, the latter is the only criterion that has been used in the past. New information will now make it necessary for nutritionists to revise present standards.

Some of the present revelations regarding iron in foodstuffs are of significance to farmers and stockmen interested in livestock feeding. The iron in soybeans was found to be 60 per cent. available, and that in alfalfa and blood, 25 per cent.

Investigations on the availability of iron were simplified by the recent development of a chemical for making this determination. The foregoing results were secured by this means and then checked by feeding trials with anemic experimental animals.

Not only iron, but also copper is needed for building blood hemoglobin. Wisconsin scientists are now investigating whether it, like iron, varies in its availability. So far the only food on which complete results have been obtained is wheat. It was found that the iron in this grain is readily available.

Science News Letter, August 17, 1935

So-called Damascus steel blades—watered steel—were produced not merely at Damascus but throughout the East.

ORNITHOLOGY

Mockingbirds Are Upholders Of Property Rights

MOCKINGBIRDS, like most songbirds, are not communists. They recognize definite property rights, and will fight vigorously to defend them, if necessary.

Mockingbird landholding customs have been carefully studied by Harold Michener and Josephine R. Michener of Pasadena (*Condor*, May-June, 1935).

When a male mockingbird in spring finds a suitable place for bringing up a family, he posts himself at a prominent point and by loud singing notifies all comers that he has staked his claim. Would-be claim-jumpers of his own sex are promptly attacked and routed. When he is joined by a female and takes her for his mate, the territory he has chosen becomes the source of the family food supply for that breeding season. The male continues to defend it, the female taking no part in his fights in defense of the home territory, but devoting herself to her maternal affairs.

But after the young ones are raised and the nest abandoned, both birds select a winter feeding territory, which often includes the nesting area but usually has wider boundaries. This they defend together, the lady being no less pugnacious than her mate if an intruder tries to forage in it.

Boundaries, once established, are usually recognized by the birds on both sides of them; though some individuals are less careful about respecting their neighbor's property rights than are others, and have to be chased home frequently.

Science News Letter, August 17, 1935

PSYCHOLOGY

Reading Improves Spelling, Even for Words Not Read

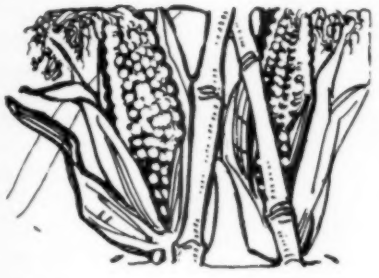
IF YOUR boy is a poor speller, reading will help him to overcome this fault. Tests of 380 men and women college students show what improvement in spelling follows reading. And surprisingly enough, the improvement extends to words not included in the matter read. The tests were made at the University of California by Dr. Luther C. Gilbert.

Reading slowly does not give any advantage in the matter of spelling improvement, the tests showed. No significant differences were found in the reading rates of those who improved greatly and those who showed little progress.

Science News Letter, August 17, 1935

AGRONOMY

NATURE RAMBLINGS
by Frank Thone



Overworking Our Mother

PRESENT-DAY America is becoming soil-conscious, as the America of a generation ago became forest-conscious under the drive of the first Roosevelt and Gifford Pinchot. Our vision and feelings have most been shocked with pictures of erosion, the spectacular punishment that water and wind bring when Earth's children, in the shamelessness of their greed, strip off their mother's natural green garments and expose her naked to the scorn and buffetings of the elements.

But our abuse of the good earth threatens us with a retribution that is even more severe than the sight of these furrowings of a premature and unnatural old age. Our mother may become so tired, under our too-avid demands for too much food right now, that she will presently be unable to feed us at all.

The invisible but deadly exhaustion of the soil's fertility has been brought anew to the attention of agricultural America by Secretary Wallace. He asked organized farmers to consider, as a factor in their plans for the rebuilding of the American export trade in agricultural products, whether we might not let ourselves in for full cropping at the expense of irreplaceable losses in soil fertility.

"Can we afford to let our richest soil go the way of our virgin timber?" he asked. "Shouldn't our agricultural policy be such as to enable farmers to maintain the fertility of the land?"

This, like a number of other things Americans have had to listen to during the present national examination of conscience, is a "hard saying." It goes clean against all our past habits in agricultural practice. The whole history of American agriculture has been one of breaking new soil, farming it hard, and then when yield began to fall off, moving west to repeat the cycle.

We have been soil exploiters, soil miners, sucking natural riches of a new continent dry and shipping the best of our soil resources into the cities and away to Europe, invisibly wrapped up in wheat and lard and cotton. We suddenly realize that we are scooping closer to the bottom of the barrel, and the realization carries a decided scare with it.

But disaster, though possible, is not unavoidable. The long-settled lands of Europe continue to yield, because men there have perforce learned to use, yet to stop short of abuse. The vineyards on the Rhine have been there since the time of Augustus, the wheatfields of Tuscany since the days of Romulus. Farming of that kind of course requires more labor, and especially more thought. Nevertheless, that is what we must come to. There is no more West, to receive us when we would run away from our own mistakes in overtasking the land.

We must learn to work our mother within her strength, and to refresh her when she becomes tired, lest she die and leave us hungry, with no more food in the house.

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AGRICULTURE-ARCHAEOLOGY

To Improve Mayan Farming Used Thousands of Years

MODERN agricultural science has just taken a look at Mayan corn growing, down in central Yucatan, with a view to aiding these Indians to increase the amount of corn they produce.

The preliminary study, just completed, was made by Prof. R. A. Emerson of Cornell University at the invitation of the Carnegie Institution of Washington. J. H. Kempton of the U. S. Department of Agriculture accompanied Prof. Emerson to the region of Pisti, Yucatan.

Prof. Emerson investigated the possibility that ancient ancestors of Mayan Indians had a more intensive type of farming than primitive methods in Yucatan today. Mayan cities, now abandoned ruins, might have been deserted, it was thought, because of inadequate agriculture.

Prof. Emerson concludes that the simple modern methods of corn growing are similar to those of the Mayan civilization long ago. No other general method, he finds, would be feasible under conditions existent then and now. Even with these methods it is possible to grow corn enough to support 15 to 20 times as many Mayas as now inhabit Yucatan.

Weeds keep the Mayan farmers moving on, from one field to another.

"The Mayas almost never grow more than two crops of corn on the same land," Prof. Emerson says. "They move over and start again, not because the land is depleted in fertility, but because the second season crop of weeds have seeded themselves and grown luxuriantly. The average land use is about a 12-year rotation."

Four acres of land now produce about 15 to 20 bushels of corn to the acre, and supply an average family with a little left over to sell, so that they can buy cloth and other supplies.

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Ostriches traditionally can digest anything, but the New York zoo lost a Darwin cassowary, ostrich-like bird, which tried to digest seven pop bottle tops, a metal doll, a wooden spool and a vanity case top.

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First Glances at New Books

Psychology

ADULT INTERESTS—Edward L. Thorndike—*Macmillan,* 265 p., $3.25. Interest is the lever with which the burden of dull learning is lifted. The interest need not be in the subject itself. With adults, appreciation of the values to be attained by learning should provide the impetus. External interests such as are used with children—"bribes"—need not have the same use with adults. How to arouse the interests of adults is told in this interesting and authoritative book for teachers in adult education.

Science News Letter, August 17, 1935

Anthropology

SEX AND TEMPERAMENT IN THREE PRIMITIVE SOCIETIES — Margaret Mead —*Morrow,* 335 p., $3. Studying three tribes, Dr. Mead has found evidence that personality traits which civilization calls masculine and feminine are not thus classified in all societies. Arapesh men and women alike are gentle, passive and mild. Mundugumor men and women are violent, aggressive. That society shapes the personalities of the two sexes, and can mould them differently in a planned social order, is the verdict of this ethnologist.

Science News Letter, August 17, 1935

Ethnology

THE TARAHUMARA, AN INDIAN TRIBE OF NORTHERN MEXICO—Wendell C. Bennett and Robert M. Zingg—*Univ. of Chicago Press,* 412 p., $4. This tribe, famed for the endurance of its runners, has other claims to distinction, as this very complete study of Tarahumara life shows. So isolated are most of these people that even today the majority of the 40,000 members of the tribe speak no Spanish and follow a primitive pattern of life, with only a thin veneer of the modern and foreign. These conditions make them excellent subjects for the student of cultures.

Science News Letter, August 17, 1935

Anthropology

THE MEDICINE-MAN OF THE AMERICAN INDIAN AND HIS CULTURAL BACKGROUND—William Thomas Corlett—*Thomas,* 369 p., $5. A modern physician looks at the Indian medicine man, and appraises his knowledge and place in society. While there is much information about plants and medical treatments used in different parts of America, Dr. Corlett stresses the fact that this is not a medical book: "It has as much religion as medicine, and more theology than pathology. If it were not so it would not be a true account of the medicine-man of the American Indian."

Science News Letter, August 17, 1935

Psychology

BEGINNING AGAIN—Harry H. Pace—*Dorrance,* 72 p., $1.00. A group of inspirational passages, poems, and quotations, intended to relieve the disappointed. The little volume concludes with the well-known "Invictus."

Science News Letter, August 17, 1935

Geography

THE GASPÉ—John M. Clarke—*Yale Univ. Press,* 203 p., $3. A geologist with a keen appreciation of this corner of Quebec Province has written its traveler's tale. Being a geologist, he has taken the opportunity to stress the beauty and the historic interest of the earth itself in this region. However, he has not neglected Indians, wild life, legend, and history in showing off the Gaspé Peninsula through a geologist's eye.

Science News Letter, August 17, 1935

Meteorology

WEATHER—K. S. Hazeltine, Fred Buss, Gayle Pickwell and Emily Smith—*Calif. State Dept. of Education,* 34 p., 15c. This pamphlet, for elementary schools, discusses the climate of California; a better "sample" state could hardly have been chosen, for variety in both place and season.

Science News Letter, August 17, 1935

Zoology

FROGS, TOADS AND SALAMANDERS—Edith A. Pickard—*Calif. State Dept. of Education,* 55 p., 15c. Condensed, but giving the essentials clearly and with good illustrations, this pamphlet will be useful in the elementary schools, for which it is designed.

Science News Letter, August 17, 1935

Paleontology

THE CLASSIFICATION OF THE EDRIOASTEROIDEA—R. S. Bassler—*Smithsonian Institution,* 11 p., 10c.

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Archaeology-History

OUR ANCESTORS IN THE ANCIENT WORLD—Ethel I. Salisbury and Lulu M. Stedman—*Little, Brown,* 396 p., $1.20. Nicely illustrated and equipped with suggestions for activities and readings to fit the units of study, this text book offers ancient history according to the newest educational ideas. Old World civilizations, including Babylonian, Cretan and Greek, are described from the standpoint of what each bequeathed to modern society. The text is apparently intended for older elementary school pupils.

Science News Letter, August 17, 1935

Geology

ALONG THE HILL—Carroll Lane Fenton—*Reynal & Hitchcock,* 96 p., $1.25. A little book, shaped to go into a pocket, that tells in very simple language and clean-cut line illustration the story of the stones and fossils you find in average country, and of what they signify in the places where you find them. Once more Dr. Fenton does credit to himself as a geologist, as a popularizer and as a draftsman.

Science News Letter, August 17, 1935

History of Science

EXPOSÉS D'HISTOIRE ET PHILOSOPHIE DES SCIENCES: I. LES MATHÉMATIQUES EN GRÈCE AU MILIEU DU VE SIÈCLE—Abel Rey, 92 p., 18 fr.; II. LA PHILOSOPHIE LA MATIÉRE CHEZ LAVOISIER—Hélène Metzger, 46 p., 10 fr.; *Hermann et Cie., Paris.*

Science News Letter, August 17, 1935

Chemistry

EXPOSÉS DE CHIMIE GÉNÉRALE ET MINÉRALE — VOL. V. — RECHERCHES SUR LES CONBINAISONS ENTRE LES SELS DE CALCIUM ET LES ALUMINATES DE CALCIUM—J. Foret—*Hermann et Cie., Paris,* 67 p., 15 fr.

Science News Letter, August 17, 1935

Physics

EXPOSÉS DE RADIOACTIVITÉ ET DE PHYSIQUE NUCLÉAIRE—VOL. III—RADIOACTIVITÉ ARTIFICIELLE — F. Joliot and Irène Curie—*Hermann et Cie., Paris,* 28 p., 3 plates, 10 fr.

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